

REMARKS/ARGUMENTS

Reconsideration of the present application is respectfully requested. Claim 28 has been cancelled and claims 1, 3, 5, 15, 25, and 29 have been amended. Claims 1-27 and 29-33 are presently pending with claims 1, 15, and 25 being independent.

In the Office Action dated January 21, 2005, the specification is objected to because the Abstract of the Disclosure contains the phrases "Are disclosed" and "The inventive." The Abstract of the Disclosure has been amended to remove these phrases as suggested by the Examiner and accordingly the objection to the specification is now moot.

In the Office Action dated January 21, 2005, claims 1-33 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,537,942 to Wickstrom ("Wickstrom '942 patent") in view of U.S. Patent No. 5,269,237 to Baker et al. ("Baker et al. '237 patent"). However, Applicant respectfully suggests that none of the prior art references, when considered singly or in combination, show or suggest the use of the structure or the steps recited in the claims.

Turning first to the independent claims, claim 1 as amended recites a furrow opener including a rotatable disc operable to be pulled in a forward direction to thereby open a furrow, a seed boot fixed relative to one side of the disc and being operable to insert seed in the furrow, and a fertilizer injector wing fixed to the seed boot and being operable to form a fertilizer bed. The fertilizer injector wing includes a nozzle operable to inject a toxic charge of ammoniacal fertilizer into the fertilizer bed. The fertilizer injector wing is positioned adjacent the outboard side of the seed boot so that the seed boot is positioned between the disc and wing and the fertilizer injector

wing includes an outboard portion positioned below the outboard side of the seed boot and angling away therefrom. The outboard portion presents a leading edge relative to the forward direction wherein at least a portion thereof intersects the furrow when the disc is pulled in the forward direction.

Independent claim 25 as amended recites a fertilizer injector wing for use with a furrow opener wherein the furrow opener includes a disc that rotates in a forward direction to open a furrow and a seed boot that forms a seed bed in the furrow and inserts seed therein. The injector wing includes an inline portion operable to engage the seed boot and presenting a generally linear axis of orientation, an outboard portion positioned below the inline portion and angling away therefrom, a leading edge at least partially disposed along the outboard portion, and nozzle including a terminal orifice in a linearly aligned trailing relationship with the leading edge. The leading edge is configured to cut a slot adjacent the seed bed wherein the slot is in communication with the furrow at least partially beneath the surface of the ground. The terminal orifice is positioned along the outboard portion and is spaced below and laterally spaced from the inline portion and configured to inject a toxic charge of ammoniacal fertilizer into the slot.

The structure recited in amended independent claims 1 and 25 enable a fertilizer injector wing that operates within the disturbed soil zone created by the disc, or at the event horizon, and thus is not a primary tillage tool. In this manner, the wing is advantageously protected by the disc from field debris – thereby significantly reducing wear – and does not drain the relatively large amounts of horsepower required to pull primary tillage tools through the unfurrowed ground.

Additionally, despite this trailing relationship between the wing and the disc, the structure of the wing creates zonal separation of the fertilizer from the seed bed. This zonal separation enables a toxic charge of ammoniacal fertilizer – a charge containing the entire nutrient package to sustain season long growth and one that would damage the germination of the seed if placed without zonal separation – to be placed simultaneously with the seed. In this regard, the recited structure enables a furrow opener that can place a toxic charge of fertilizer in close proximity with the seed row in a single, low soil disturbing planting pass without damaging the germination of the seed or disrupting the seed bed. The recited structure further enables a relatively simple, yet durable low disturbance opener capable of relatively high speed use, while optimizing reduction in weed growth and moisture loss thereby enabling better crop yield with less fertilizer requirements resulting in decreased expense and reduced polluting of the environment with nitrogen.

Independent claim 15 recites a method of simultaneously applying a toxic charge of ammoniacal fertilizer in close proximity with seed. The recited steps include fixing a seed boot relative to a rotatable disc and positioning the boot on one side thereof, fixing a fertilizer injector wing to the seed boot and laterally spacing the wing from the boot so that the seed boot is positioned between the disc and wing, pulling the disc through the soil to thereby open an elongated furrow wherein the disc creates a zone of disturbed soil in the furrow, pulling the seed boot and injector wing through the furrow to form a seed bed within the disturbed soil zone and to simultaneously form a fertilizer bed in communication with the furrow and spaced to one side of the seed bed so that a berm is formed between the seed and fertilizer beds, placing seed along the seed bed, and placing

ammoniacal fertilizer along the fertilizer bed. Practice of the recited steps enable similar advantages to those detailed above with respect to independent claims 1 and 25.

Turning now to the prior art references of record, the Wickstrom '942 patent discloses an apparatus for simultaneously seeding and fertilizing crops 10 that includes two distinct primary tillage tools – a seeding blade 12 and a separate fertilizer blade 28. These two separate primary tillage tools “create two soil openings in the ground” and the leading edges of both blades “act to cut the soil and direct the soil laterally as apparatus 10 moves forward” (col. 3, lines 5-6 and 43-45). As shown in FIG. 2, the Wickstrom '942 apparatus includes a fertilizer “chute” side-by-side a seed “chute,” with the fertilizer blade 28 positioned below both chutes. As such, the Wickstrom '942 patent fails to teach or suggest the use of the structure and/or steps recited in the independent claims 1, 15, and 25. Particularly, the Wickstrom '942 patent is deficient at showing or suggesting the use of a fertilizer injector wing that includes an outboard portion, positioned below the outboard side of the seed boot and angling away therefrom, that presents a leading edge relative to the forward direction wherein at least a portion thereof intersects the furrow when the disc is pulled in the forward direction. In a similar manner, the Wickstrom '942 patent does not teach or suggest a leading edge on a fertilizer wing configured to cut a slot adjacent the seed bed and a nozzle including a terminal orifice in a linearly aligned trailing relationship with the leading edge and being configured to inject a toxic charge of ammoniacal fertilizer into the slot wherein the terminal orifice is positioned along the outboard portion and spaced below and laterally spaced from the inline portion. Additionally, the Wickstrom '942 patent, with its primary tillage fertilizer blade, is deficient

at showing or suggesting the use of the step of pulling the seed boot and injector wing through the furrow to form a seed bed within the disturbed soil zone and to simultaneously form a fertilizer bed in communication with the furrow and spaced to one side of the seed bed so that a berm is formed between the seed and fertilizer beds. Furthermore, the Wickstrom '942 patent discloses similar seed and fertilizer "conduits" 24 and 36, respectively, both being configured to gravity plant granules or pellets (FIG. 2), with the lower opening of each "conduit" being very close together. As such, the Wickstrom '942 patent fails to teach or suggest the use of an injector wing for injecting a toxic charge of ammoniacal fertilizer in the fertilizer bed. As further detailed below, the apparatus disclosed in the Wickstrom '942 patent could never be used to inject a toxic charge of ammoniacal fertilizer into the fertilizer bed.

The Baker et al. '237 patent discloses a seed sowing apparatus including a rotatable blade 3, a tine 4, and a chute 6. The blade 3 and tine 4 cooperate to cut a slot and a shelf for either seed or fertilizer, but not both. In order to place both seed and fertilizer, a second tine must be added, not to the original chute, but on the opposite side of the blade (col. 3, lines 20-23 and FIGS. 2A and 2B). As such, the Baker et al. '237 patent fails to teach or suggest the use of the structure and/or steps recited in the independent claims 1, 15, and 25. Particularly, the Baker et al. '237 patent is deficient at showing or suggesting the use of a fertilizer injector wing fixed to the seed boot and being operable to form a fertilizer bed wherein the fertilizer injector wing is positioned adjacent the outboard side of the seed boot so that the seed boot is positioned between the disc and wing. Similarly, the Baker et al. '237 patent fails to teach or suggest the use of a fertilizer injector wing

including an inline portion operable to engage the seed boot and presenting a generally linear axis of orientation that is generally parallel to vertical when the inline portion engages the seed boot and an outboard portion positioned below the inline portion and angling away therefrom. In a similar manner, the Baker et al. '237 patent is deficient at showing or suggesting the use of the step of fixing a fertilizer injector wing to the seed boot and laterally spacing the wing from the boot so that the seed boot is positioned between the disc and wing. Furthermore, the Baker et al. '237 patent discloses a single seed/fertilizer "chute" 6 configured to gravity plant granules or pellets (FIG. 1A). As such, the Baker et al. '237 patent fails to teach or suggest the use of an injector wing for injecting a toxic charge of ammoniacal fertilizer in the fertilizer bed. As further detailed below, the apparatus disclosed in the Baker et al. '237 patent could never be used to inject a toxic charge of ammoniacal fertilizer into the fertilizer bed.

Applicant submits that the motivation to combine the Wickstrom '942 dual tillage blade patent with the Baker et al. '237 single chute patent in the manner proposed in the Action to arrive at the claimed invention simply does not exist. Applicant respectfully submits that there is nothing in the Office Action pointing to specific information in these references that suggest the desirability of the claimed invention through their combination. Furthermore, there is nothing in the Action indicating where in the knowledge of one ordinarily skilled in the art or in the nature of the problem solved a motivation can be found that suggests the desirability of the claimed invention through combining the cited references. The motivation to combine the references in the manner proposed in the Action to arrive at the claimed invention simply does not exist. In this respect, the

proposed combination of these references amounts to improper hindsight and use of the present invention as a blueprint. *See, In re Dembiczak* 175 F.3d 994, 999-1000 (Fed. Cir. 1999). That is to say, if the mind is properly cast back to the time of invention, there is nothing to motivate one to combine the references in a manner to arrive at the claimed invention. *Id.* The use of hindsight is always forbidden. *In re Rouffet*, 47 USPQ2d 1453, 1458 (Fed. Cir. 1998); *M.P.E.P.* § 2142.

Applicant was confronted with the problem of placing a toxic charge of ammoniacal fertilizer closer to the seed bed so that both the toxic charge and the seed could be placed in a single pass with as low of drag equipment as possible. Those ordinarily skilled in the art would not look to gravity feed fertilizers (e.g., the Wickstrom '942 and the Baker et al. '237 patents) to solve this problem. You simply cannot gravity feed ammoniacal fertilizer close to the seed bed; the risk of damaging seed germination is simply too great. Heretofore, every non-broadcast type ammoniacal fertilizer feeder has required a separate primary tillage tool to cut a fertilizer bed. In fact, Dr. Baker, an inventor named in the Baker et al. '237 patent, previously approached Applicant requesting Applicant to adapt Applicant's prior liquid NH₃ injection technology to one of his "T" openers, but the project was foiled as too implausible. "The prior art must suggest the desirability of the claimed invention." *M.P.E.P.* § 2143.01. Relatedly, without this necessary suggestion of desirability, the mere fact that the references can be combined is not sufficient to establish obviousness. *Id.* There is simply no suggestion of desirability that combining single chute and dual chute gravity feed fertilizers arrives at the simultaneous placement of a toxic charge of ammoniacal fertilizer in a

fertilizer bed formed at least partially in the furrow housing the seed bed in a single pass of low drag equipment enabled by the claimed invention.

However, the hypothetical combination of the single and dual chute gravity feed fertilizers as proposed in the Action either fails to arrive at the claimed invention (as discussed in detail below) or requires several changes in the principles of operation of the dual-bladed dual chute gravity feed reference. "If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious." *M.P.E.P.* § 2143.01. The claimed invention of amended claim 1 recites, among other things: 1) a rotatable disc operable to be pulled in a forward direction to thereby open a furrow, 2) a fertilizer injector wing fixed to the seed boot and being operable to form a fertilizer bed, wherein the wing is positioned adjacent the outboard side of the seed boot so that the seed boot is positioned between the disc and wing, 3) the fertilizer injector wing including a nozzle operable to inject a toxic charge of ammoniacal fertilizer into the fertilizer bed, and 4) the outboard portion of the wing presenting a leading edge relative to the forward direction wherein at least a portion thereof intersects the furrow when the disc is pulled in the forward direction. Similarly, the claimed invention of amended independent claim 25 recites, among other things: 1) a leading edge at least partially disposed along the outboard portion of the wing being configured to cut a slot adjacent the seed bed and 2) a nozzle including a terminal orifice in a linearly aligned trailing relationship with the leading edge and being configured to inject a toxic charge of ammoniacal fertilizer into the slot. In a similar manner, the claimed invention of claim 15

recites among other things, the steps of: 1) fixing a fertilizer injector wing to the seed boot and laterally spacing the wing from the boot so that the seed boot is positioned between the disc and wing, 2) pulling the disc through the soil to thereby open an elongated furrow wherein the disc creates a zone of disturbed soil in the furrow, 3) pulling the seed boot and injector wing through the furrow to form a seed bed within the disturbed soil zone and to simultaneously form a fertilizer bed in communication with the furrow and spaced to one side of the seed bed so that a berm is formed between the seed and fertilizer beds, and 4) placing ammoniacal fertilizer along the fertilizer bed. In order to arrive at the hypothetical combination suggested in the Action, at least three principles of operation of the Wickstrom '942 opener would have to change: 1) both blades would have to be removed and replaced with a single disc so that the seed chute is positioned between the disc and the fertilizer chute, 2) the fertilizer chute would have to be moved so that it at least partially drags through the furrow opened by the disc, and 3) the gravity feed fertilizer chute would have to be replaced with a nozzle that dispenses a toxic charge of ammoniacal fertilizer. Furthermore, even if all of these critical principles of operation were modified, the resultant opener could not, and would not, enable a toxic charge of ammoniacal fertilizer to be safely placed simultaneous with the seed.

Moreover, even if these references are combined in the manner suggested in the Action, the proposed combination still falls short of the claimed invention. For example, such a hypothetical combination still fails to teach or suggest positioning the seed boot between a disc and the fertilizer injection wing so that the leading edge of the wing at least partially intersects the furrow opened by the disc. Moreover, as detailed above, the hypothetical combination also fails to teach

or suggest injecting a toxic charge of ammoniacal fertilizer into the fertilizer bed simultaneously with placing the seed in the seed bed. Neither of the cited references teach drawing a portion of the leading edge of fertilizer wing through a furrow opened by a disc and neither teach injecting a toxic charge of ammoniacal fertilizer simultaneously with placement of the seed. The cited references teach single chutes or side-by-side chutes, and both teach gravity fed fertilizer. Because the proposed combination of the references still fails to arrive at the claimed invention, a *prima facie* case of obviousness has not been established. See *M.P.E.P.* §§ 2142, 2143, 2143.03. The references simply fail to teach or suggest the use of all the limitations of the claims. The obviousness rejection must consequently be withdrawn.

In view of the foregoing, it is respectfully submitted that the invention recited in claims 1, 15, and 25 is allowable over the prior art references of record. Claims 2-14 depend directly or indirectly from claim 1, claims 16-24 depend directly or indirectly from claim 15, and claims 26-27 and 29-33 depend directly or indirectly from claim 25. These dependent claims recite additional features of the invention not shown or suggested in the prior art. For example, dependent claims 5 and 6 recite the terminal orifice of the nozzle being recessed relative to the leading and lower-most edges of the wing and a delivery system cooperating with the terminal orifice to pressurize the gaseous ammoniacal fertilizer at least below the vapor pressure of the ammoniacal fertilizer so that the injector wing injects liquid fertilizer into the furrow.

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Amdt. dated May 23, 2005
Reply to Office Action of January 21, 2005

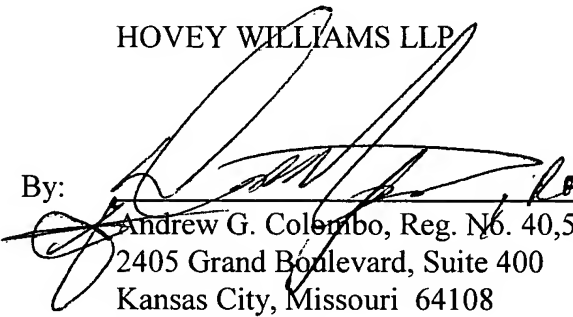
Therefore, the present application should now be in condition for allowance and such allowance is respectfully requested. Should the Examiner have any questions, please contact the undersigned at (800) 445-3460.

A one-month Petition for Extension of Time accompanies this Amendment, along with authorization to charge \$60.00 to the undersigned's Deposit Account No. 19-0522 for the petition fee set forth in 37 C.F.R. § 1.17. The Commissioner is further authorized to charge any additional fees associated with this communication or credit any overpayment to said Deposit Account.

Respectfully submitted,

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